



September 29, 2005

Ms. Kasey Ashley
California Regional Water Quality Control Board
North Coast Region
5550 Skylane Boulevard, Suite A
Santa Rosa, California 95403

Re: **Site Investigation Work Plan**
Norman's Dry Cleaners & Laundry
2907 E Street, Eureka, California
File No. 1NHU630
Project No. 591

Dear Ms. Ashley:

Environmental Forensic Investigations Inc. ("EnviroForensics") is pleased to submit the attached Site Investigation Work Plan on behalf of Norman's Dry Cleaners & Laundry. This Work Plan presents the proposed scope of work to complete the investigation at the Norman's Dry Cleaners & Laundry site.

Should you have any questions or require additional information, please contact me.

Sincerely,

Environmental Forensic Investigations, Inc.

A handwritten signature in black ink, appearing to read "John C. Bird".

John C. Bird, P.G.
Western Regional Manager

Enclosure

CC: Site Investigation Work Plan



September 29, 2005

Ms. Kasey Ashley
California Regional Water Quality Control Board
North Coast Region
5550 Skylane Boulevard, Suite A
Santa Rosa, California 95403

Subject: Work Plan for Soil and Groundwater Characterization, Norman's Dry Cleaners & Laundry, 2907 E Street, Eureka, California
File No. 1NHU630

Dear Ms. Ashley:

Environmental Forensic Investigations, Inc. (EnviroForensics) has prepared this Work Plan for further soil and groundwater characterization at Norman's Dry Cleaners & Laundry located in Eureka, California (Site). This Work Plan is designed to fulfill the requests for additional soil and groundwater characterization as described in the Cleanup and Abatement Order No. R1-2003-0088 issued to KFD Enterprises Incorporated dba Norman's Dry Cleaners & Laundry. The objective of the characterization activities is to further define the lateral and vertical extent of soil and groundwater impacts beneath, and in the vicinity of, the Site. Based on the findings of the scope of work included in this Work Plan, additional site investigation tasks may be appropriate.

SITE BACKGROUND

Site Description

The Site is located at 2907 E Street, at the southeast corner of E Street and Grotto Street in Eureka, California (Figure 1). The Site consists of a building that currently houses Norman's Dry Cleaners & Laundry. Historically, a UNOCAL service station consisting of a single story building; three pump islands, two 10,000-gallon underground storage tanks and one 280-gallon underground waste-oil tank operated at the Site. The service station was constructed in approximately 1964 and operated until the 1970's. The underground storage tanks and fuel dispensing islands were removed in September 1980. Mr. Ken Daer purchased the Site in the early 1980's and the current building was constructed (Winzler & Kelly, January 2001).

Geology and Hydrogeology

The Site is located within the city limits of Eureka. The United States Geological Survey (USGS) 1978 Eureka topographic map places the Site at about 130 feet above mean sea level and in a developed area with residential and commercial properties. Topography at the Site is relatively flat. An unnamed creek is located approximately 0.4 miles southwest of the Site, and flows in a southerly direction to Martin Slough.

Based on lithologic information provided on well construction logs (Environmental Resolutions, Inc (ERI) February 2004), the Site is underlain by sand and sand with silt to a depth of at least 30 feet. A layer of fine-grained material (identified as fine-grained sandy silt, ERI, September 15, 2003) ranging in thickness from 1 to 5 feet, is present at a depth of 9 to 10 feet below the ground surface (bgs). This layer was not identified east of the Site at MW-6 and MW-7. Groundwater encountered above this layer is reportedly perched. ENSR International (ENSR, Work Plan, December 22, 2004) has described groundwater above the fine-grained layer as "the water table (upper zone)" and water below this layer as "the first aquifer (lower zone)". Based on the proposed work scope included in this Work Plan, EnviroForensics anticipates encountering a water bearing zone beneath the lower zone. For purposes of this Work Plan, the upper zone will be referred to as Zone A, the lower zone will be referred to as Zone B, and the next deeper water bearing zone, if encountered, will be referred to as Zone C.

The regional groundwater flow direction is inferred to be in a northwesterly direction. Based on previous Site investigations, groundwater is first encountered at approximately 4 feet to 8 feet bgs. Initial monitoring wells installed at the Site were constructed across the fine-grained material described above and were screened in both Zone A and Zone B. Construction of these wells allowed a possible pathway for water from Zone A and Zone B to co-mingle. Water level elevation data from these monitoring wells may be biased by co-mingling of water between Zone A and Zone B. Subsequent monitoring wells have been installed to monitor groundwater conditions in either Zone A or Zone B, but not both. Potentiometric surface maps generated from water level elevation data from these monitoring wells (MW-8A, MW-9A, and MW-10A, in Zone A and MW-8B, MW-9B, and MW-10B in Zone B) indicate groundwater in Zone A flows to the west and groundwater in Zone B flows to the northwest (ENSR, March 29, 2005).

Previous Characterization Results

Previous investigations at the Site have been conducted to assess the lateral and vertical extent of impacts to soil and groundwater that may have resulted from previous and current activities at the Site. EnviroForensics has reviewed the results of the previous investigations and incorporated those results into this Work Plan. Soil boring and monitoring well locations previously installed at, and near, the Site are shown on Figure 2. Tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and petroleum hydrocarbons in the gasoline range,

including benzene, toluene, ethyl benzene, and xylene have been detected in soils and/or groundwater at the Site. PCE, gasoline, and waste oil have been historically stored onsite. TCE, and cis-1,2-DCE are transformation products that are formed from the reductive dechlorination of PCE when conditions are suitable.

Soil Characterization

Soil samples have been collected at the Site, at depths varying from 5.5 feet to 19 feet bgs. Samples from two exploratory borings (B-5 and B-7) and five monitoring well borings (MW-2, MW-3, MW-8B, MW-9B, and MW-10B) were analyzed for the presence of volatile organic compounds (VOCs). PCE has been detected in five of the soil samples in concentrations up to 250 milligrams per kilogram (mg/kg) in the sample collected at a depth of 5.5-6.0 feet at MW-3. PCE was not detected in soil samples collected from boring B-5 or the borings for monitoring wells MW-2, MW-8B, or MW-10B. Based on these analytical results, one source of PCE at the Site appears to be the eastern portion of the property, where dry cleaning activities are located.

Groundwater Characterization

Groundwater chemistry Zone A and Zone B at, and near, the Site has been monitored using a series of monitoring wells (MW-1 through MW-13B). The locations of these monitoring wells are shown on Figure 2. Monitoring wells MW-1 through MW-5 were installed across the fine-grained sandy silt layer that separates Zone A from Zone B, and have subsequently been abandoned. Reportedly this fine-grained sandy silt layer is of variable thickness, and was not identified east (up gradient) of the facility at MW-6 or MW-7, which also have been abandoned.

PCE and related transformation compounds, TCE and cis-1,2-DCE, have been detected in groundwater beneath, and in the vicinity of, the Site. The highest concentrations of PCE are present at MW-3 (6,900 micrograms per liter ($\mu\text{g/L}$) (Winzler & Kelly, December 2001), and MW-9A (2,100 $\mu\text{g/L}$) and MW-9B (12,000 $\mu\text{g/L}$) (ERI, February 2004). Monitoring well MW-3 has been abandoned. MW-9A monitors groundwater chemistry in Zone A and MW-9B monitors groundwater chemistry in Zone B.

Regional Water Quality Control Board (RWQCB) personnel collected groundwater samples from monitoring wells situated on the Henderson Center Rocket site located at 414 Harris Street (approximately one block south of the Site) on June 25, 2002, and from surface water southwest of the Site on March 27, 2003. These samples were analyzed for VOCs. Analytical results from these samples indicated that low concentrations of PCE (0.36 $\mu\text{g/L}$) and TCE (0.18 and 0.61 $\mu\text{g/L}$) are present in groundwater south of Harris Street, south of the Site (Sequoia Analytical, July 11, 2002). No PCE or related transformation products are present in surface water southwest of the Site (Alpha Analytical, Inc., April 9, 2003).

SCOPE OF WORK

The objective of the soil and groundwater characterization activities presented in this Work Plan is to further define the lateral and vertical extent of impacts to soil and groundwater beneath, and in the vicinity of, the Site. Soil chemistry near the potential source area and groundwater chemistry in the upper three saturated intervals (Zone A, Zone B, and Zone C) will be assessed. In addition, the characterization activities are designed to better define the hydrogeologic conditions in the area. Five initial sampling locations have been selected to confirm subsurface stratigraphy and to further define the lateral and vertical extent of impacts to groundwater near the Site (see Figure 3). Additional exploratory borings will be advanced if warranted.

- One location is situated west of the site, on the west side of E Street. One location is situated northwest of the Site north of the intersection of Grotto Street and E Street. Groundwater in Zone A flows west and groundwater in Zone B flows northwest (ENSR, March 2005). These two proposed locations will be coordinated with ENSR, the environmental consultant for the former Unocal Service Station No. 5357, to maximize data from existing monitoring wells situated near these proposed locations. These two proposed locations are situated in the downgradient flow direction from the Site for Zone A and Zone B.
- One location is situated south of the Site near the intersection of Harris Street and E Street. The vertical profile for groundwater chemistry between the Site and the Henderson Center Rocket site, at which low concentrations of PCE and TCE have been detected, will be characterized at this location.
- One location is situated east of the Site, to assess groundwater chemistry up gradient of the Site.
- One location has been proposed on the Site, to assess the vertical extent of groundwater contamination near the source area.

To minimize the potential for cross-contamination, reconnaissance groundwater samples will be collected from individual Hydropunch[®] borings at each location at three depth intervals to qualitatively delineate the vertical and lateral extent of impacts at these five locations. Prior to collecting reconnaissance groundwater samples, lithologic logs will be generated using Cone Penetrometer Testing ("CPT") technology. These lithologic logs will be reviewed to assess subsurface stratigraphy. It is anticipated that discrete water bearing intervals (Zone A, Zone B, and Zone C) and less permeable material will be present and identifiable from the lithologic logs. Reconnaissance groundwater samples will be collected from the base of each of these three zones using Hydropunch[®] technology. The reconnaissance groundwater samples will be tested for VOCs by EPA Method 8260B on an expedited basis by an off-site laboratory.

Based on the analytical results for these samples, additional CPT/Hydropunch[®] borings may be warranted. The RWQCB will be informed by telephone of the findings of the initial CPT and

Hydropunch[®] investigation, and, if warranted, additional locations will be proposed from which to collect reconnaissance groundwater samples to further delineate the extent of impacts to groundwater. In order to expedite the field work, prior to initiation of this phase of the investigation, three additional proposed CPT locations (see Figure 3) will be permitted and cleared of underground utilities. Locations of additional exploratory borings will be selected based on site access, permitting requirements, and utility locations.

Upon completion of the reconnaissance groundwater-sampling program, monitoring wells will be installed to monitor groundwater chemistry at up to three depth intervals at three locations. The specific locations and depth intervals will be selected based on the CPT logs and laboratory results for the reconnaissance groundwater samples. At each of these three locations, one monitoring well will be installed in Zone A (if present) and in Zone B. If the results of the reconnaissance groundwater sampling program identify impacts to groundwater in Zone C, monitoring wells will be installed to monitor groundwater chemistry and determine the direction and gradient of groundwater flow in this interval.

Proposed soil boring locations are shown on Figure 2 and Figure 3. Previous studies have identified PCE in soil boring B-7 (0.090 mg/kg at 5.5 feet bgs), at MW-3 (250 mg/kg and 1.7 mg/kg at 5.5 and 10 feet bgs respectively), and at MW-9D (0.020 mg/kg and 0.470 mg/kg at 5.5 feet and 10 feet bgs respectively). Based on the analytical data from soil samples collected at the Site, it appears a single source of impacts to shallow soil is present near the dry cleaning operation on the eastern portion of the Site. To further characterize impacts to soil near the potential source area, five exploratory borings will be advanced. One boring will be installed to assess potential impacts to soil within the dry cleaning building, if feasible. Three borings will be advanced near MW-3, the location that has exhibited the highest concentration of PCE in soil, and one boring will be advanced west of the dry cleaning building to assess potential impacts to soil that may be present west of active dry cleaning operations. These locations have been selected to supplement existing soil analytical data for the Site and to further delineate the lateral and vertical extent of impacts to soil near the potential source area.

This work scope has been designed to utilize existing data provided from other investigations at and near the Site. Field work will be coordinated with other ongoing investigations in the area to minimize duplication of work being conducted by others on and near the Site. Work will be conducted by an EnviroForensics staff member working under the direction of a California registered Professional Geologist.

Task 1 – Pre-field activities

As part of the pre-field activities, EnviroForensics will:

- Obtain access agreements from private property owners and encroachment permits from the City of Eureka, as needed. The exact locations of the proposed borings and monitoring wells will be based on field constraints, such as permitting and access agreements, and utility locations;
- Locate and mark the proposed boring locations;
- Survey the proposed locations for subsurface utilities;
- Obtain boring and well permits from the County of Humboldt Division of Environmental Health;
- Procure a drilling subcontractor; and,
- Prepare a site-specific Health and Safety Plan.

At least 48 hours prior to drilling activities Underground Service Alert (USA) will be notified of the drilling program. EnviroForensics will notify the property owners, operators, and nearby businesses of the proposed investigation 48 hours prior to mobilization to conduct the fieldwork. EnviroForensics will retain the services of a utility locating company to clear all proposed drilling locations of subsurface utilities. Access to the off-site properties will require negotiation with property owners and possibly assistance from the RWQCB.

Task 2 –Cone Penetrometer Testing (CPT)/Groundwater and Soil Testing

Cone Penetration Testing

CPT technology uses an integrated electronic cone system to produce a continuous lithologic log by measuring cone bearing, sleeve friction and dynamic pore water pressure during boring advancement. Proposed CPT locations are shown on Figure 3. CPT logs and reconnaissance groundwater samples will be collected from five locations. Three of these initial CPT borings will be advanced to an approximate depth of 70 feet bgs to determine subsurface stratigraphy. This depth is estimated, and may be revised, based on review of the initial CPT lithologic logs. If subsurface material is similar at each of these CPT locations, and Zone A, Zone B, and Zone C are present, the depth of subsequent CPT borings may be reduced, depending on the depth and thickness of the Zone C water bearing interval.

Reconnaissance Groundwater Sampling

The objective of reconnaissance groundwater sampling is to better define the lateral and vertical extent of impacts beneath and near the Site and to determine locations and depths for groundwater monitoring wells. PCE has a specific gravity greater than 1, and will sink through groundwater. Based on the hydrogeologic data provided by the CPT logs, groundwater samples will be collected from the bottom of three strategically targeted depths (Zone A, Zone B, and Zone C) using Hydropunch[®] sampling technology. To minimize the potential for cross

contamination, reconnaissance groundwater samples will be collected from the three water bearing zones from discrete Hydropunch® borings.

The Hydropunch® sampler operates by advancing 1 ¾ inch hollow push rods equipped with a filter tip in a closed configuration to the base of the desired sampling interval. The actual depth for the reconnaissance groundwater samples will be determined based on review of the CPT lithologic logs generated in the field. Once the desired sample depth is reached, the push rods are retracted; exposing the encased filter screen and allowing groundwater to infiltrate hydrostatically from the formation into the inlet screen. A small diameter bailer is lowered through the push rods into the screen section for sample collection. The bailer is returned to the surface and the retrieved groundwater sample is then decanted into the appropriate laboratory-supplied sample containers. The water samples will be analyzed for VOCs by USEPA Method 8260B.

Soil Sampling

Previous studies at the Site have identified impacts to soil at depths ranging from 5.5 feet to 10 feet bgs. To supplement analytical data already generated for the Site, soil samples will be collected from five additional locations to further delineate the lateral extent of impacts to shallow soil. Proposed soil sampling locations are shown on Figure 3. The soil samples will be collected from exploratory borings advanced using Geoprobe® technology. Two soil samples will be collected from each boring. One soil sample will be collected from immediately above the soil/water interface (estimated to be about 5 feet bgs) and a second sample will be collected from the top of the fine-grained sandy silt unit (estimated to be about 10 feet bgs) identified beneath the Site. If the fine-grained unit is not present, the second soil sample will be collected from the top of the upper-most fine-grained interval below the water table identified from the CPT logs. These depth intervals were selected to characterize impacts to soil at the soil/water interface, and in the upper most interval of fine-grained material identified beneath the Site.

The soil samples will be preserved consistent with USEPA Method 5035 using Encore® or similar sampling techniques. The samples will be analyzed for VOCs using USEPA Method 8260B.

The CPT probe and Hydropunch® and Geoprobe® sampling tools and push rods will be removed from the boreholes and decontaminated using a high-pressure steam cleaner. The boreholes will be tremie grouted with neat cement and completed at the surface to match the existing grade.

Traffic control procedures will be implemented. Traffic control setup (signs, barricades, etc.) and maintenance will be in accordance with the Work Area Traffic Control Handbook (W.A.T.C.H. Manual, endorsed by the American Public Works Association).

Analytical data from the soil samples will be reviewed to assess the lateral and vertical extent of impacts to soil near the dry cleaning operation. Analytical data from the reconnaissance groundwater samples will be reviewed to assess where, and at what depths, to install the proposed monitoring wells.

Task 3 - Monitoring Well Installation, Development and Sampling

This Work Plan assumes that up to three clusters of monitoring wells will be installed. The purpose of these monitoring wells is to supplement data available from monitoring wells that have been installed in Zone A and Zone B, and to characterize groundwater chemistry in Zone C, the water bearing interval anticipated Zone B. The locations and depths of the wells will be determined based on the results of the CPT and Hydropunch[®] testing. EnviroForensics will communicate with the RWQCB to discuss the results of the testing and propose monitoring well locations and screen interval depths. Upon concurrence of the proposed locations and screen intervals with the RWQCB, a letter addendum to the work plan will be prepared and submitted to the RWQCB that will identify the final well locations, screen interval depths and well installation procedures as well as standard well development and sampling procedures.

Once the additional monitoring wells have been installed and developed, a quarterly groundwater monitoring program will be initiated for the dry cleaning facility. Groundwater samples and water level measurements will be collected from the new monitoring wells and from appropriate existing monitoring wells at and near the Site. Sampling activities at the existing monitoring wells will be coordinated with the environmental consultants responsible for sampling and maintaining these wells. Groundwater samples will be tested for VOCs using Method 8260B.

The purpose of installing additional monitoring wells is to further delineate the lateral and vertical extent of impacts to groundwater in the upper three water-bearing interval, Zone A, Zone B, and Zone C (if impacts are present), and to further define the direction and gradient of groundwater flow in the vicinity of the Site.

Task 4- Surveying

A state-licensed surveyor will survey the location and elevation of all new wells and borings. Vertical control will be relative to a United States Coast & Geodetic Survey (USCGS) or U. S. Geological Survey marker. Elevations will be surveyed to the nearest 0.01 foot. Horizontal locations will be referenced to the State Plane Coordinate System. The horizontal grid coordinates of each monitoring well will be recorded to within 0.1 foot. All surveyed data will be submitted to the State Water Resources Control Board's Geo Tracker database.

Task 5 – Waste Disposal

Soil, water, and rinseate generated during field activities will be placed in Department of Transportation approved 55-gallon drums or closed top storage bins and temporarily stored on-site. Access to the stored materials will be restricted, either by placing the stored material within an existing restricted area, or by erecting a temporary fence and lockable gate to restrict access to the material. Composite samples will be collected from the drummed soil and the drums of groundwater and rinseate to characterize the material for disposal purposes. The samples will be analyzed for VOCs by EPA Method 8260B and TPH-gasoline by EPA Method 8015B. A determination will be made if the wastes are hazardous or non-hazardous based on the results of the composite samples, and waste profiles will be prepared accordingly. A waste disposal contractor will properly manage, transport, and dispose of all wastes. A representative of Norman's Dry Cleaners & Laundry will sign all waste manifests and shipping documents.

Task 6 – Site Investigation Report

A Site Investigation Report will be prepared that summarizes the results of the work activities associated with the proposed tasks. The report will include tables, maps, figures, and appendices summarizing the data collected during the field activities. The report will include a section with recommendations for further site characterization activities and projected scheduled to complete these activities, if warranted.

SCHEDULE

EnviroForensics anticipates beginning work on this project within two weeks of approval of this Work Plan by the RWQCB. We anticipate it will take up two weeks to obtain the required drilling and encroachment permits, an additional two weeks to schedule the drilling contractor and three to four weeks to complete the fieldwork. We anticipate receiving data from the laboratory two weeks after completion of the fieldwork. A draft report will be completed approximately three weeks after receipt of final reports from the analytical laboratory. Depending on receipt of the final laboratory report, a final report will be submitted to the RWQCB approximately 14-16 weeks following approval of this Work Plan. Upon approval of this Work Plan by the RWQCB, EnviroForensics will prepare a schedule with specific dates for completion of the tasks identified in this Scope of Work.


Respectfully submitted,

Environmental Forensic Investigations, Inc.

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John D. Cooper
Senior Project Manager

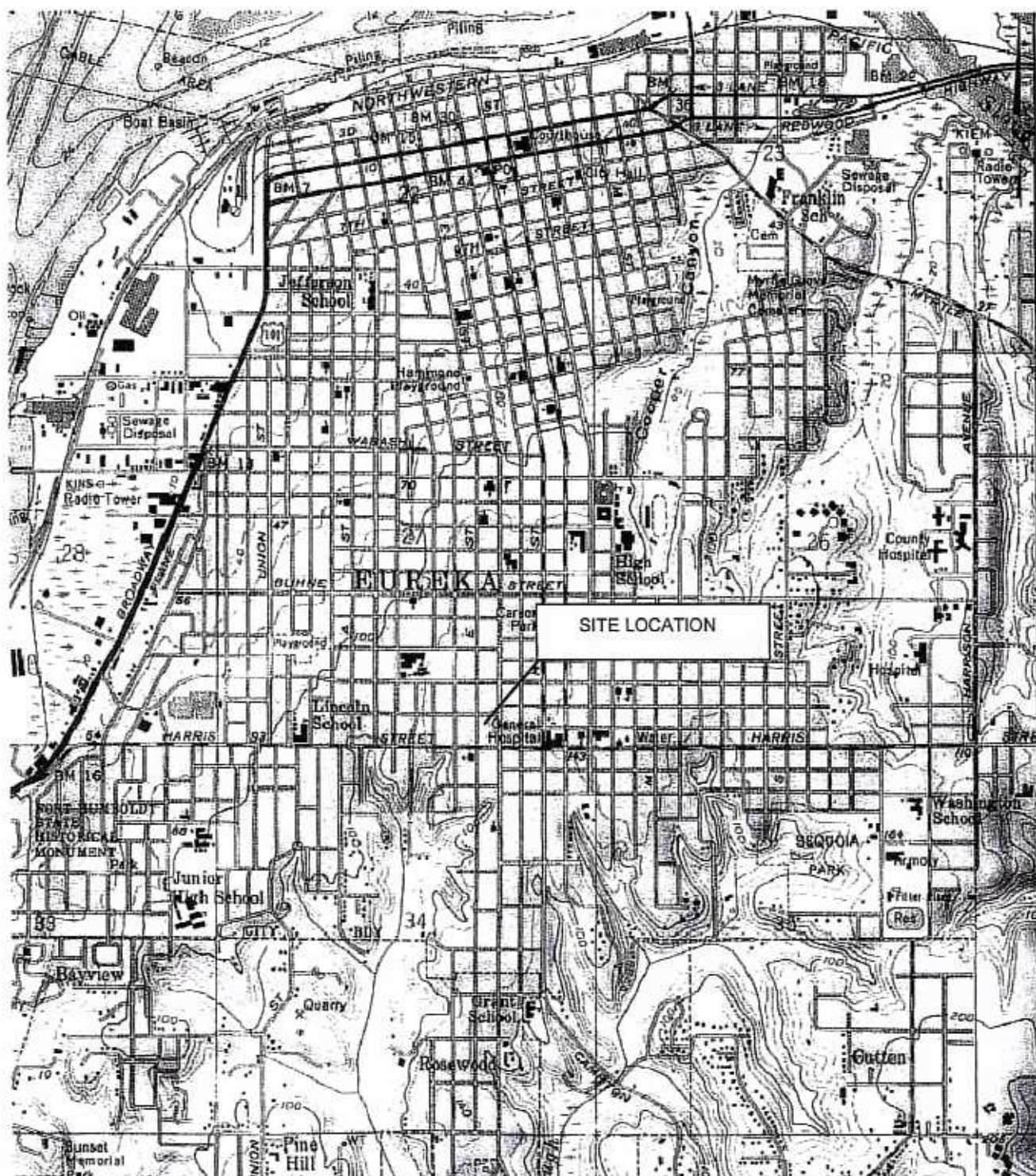
Attachments: References
Figures

A handwritten signature in cursive script that reads "John C. Bird".
John C. Bird, P.G.
Western Regional Manager

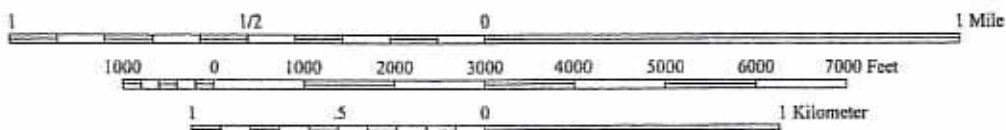
Cc: Andrew Nelson, Walsworth Franklin Bevins & McCall (4)

REFERENCES

- Alpha Analytical, Inc, April, 9, 2003, Laboratory Report
- Environmental Resolutions, Inc., February 2004, Supplemental Evaluation of Soil and Groundwater and Fourth Quarter 2003 Groundwater Monitoring and Sampling Report, Former Unocal Service Station 5357, 2907 E Street, Eureka, California. LOP No. 12694
- Environmental Resolutions, Inc., September 15, 2003, Response to Comments and Addendum to Work Plan, Former Unocal Service Station 5357, 2907 E Street, Eureka, California. LOP No. 12694
- ENSR International, December 22, 2004, Work Plan – Installation of Additional Groundwater Monitoring Wells for Further Groundwater Plume Definition and Destruction of Monitoring Wells Screened Across Two Aquifers, Former Unocal Station No. 5357, 2907 E Street, Eureka, California, LOP No. 12694
- ENSR International, March 29, 2005, Quarterly Groundwater Monitoring Results Report, First Quarter 2005, Former Unocal Station No. 5357, 2907 E Street, Eureka, California, Humboldt County LOP No. 12694
- Sequoia Analytical, July 11, 2002, Laboratory Report
- Winzler & Kelly, Consulting Engineers, January 2001, Report of Findings from Site Investigation, Norman's Dry Cleaners, 2907 E Street, Eureka, California, LOP #12694.
- Winzler & Kelly, Consulting Engineers, December 13, 2001, Quarterly Monitoring Report for the First and Third Quarters of 2001, Norman's Dry Cleaners, 2907 E Street, Eureka, California, LOP #12694.



Scale 1:24,000



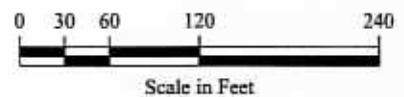
Source: TOPOI, Wildflower Productions, 2000

No.	Date	Revision	Approved	ENVIROforensics	Date:	03/31/05	SITE LOCATION MAP Norman's Cleaners and Laundry 2907 E Street Eureka, CA	Figure
				ENVIRONMENTAL FORENSIC INVESTIGATIONS, INC.	Designed:	OS		1
				4334 Hacienda Drive, Suite 250 • Pleasanton, CA 94568	Drawn:	OS		Project
				Shawn@enviroforensics.com	Checked:	SAIK		591.A.03
					DWG file:	13111-05		



Legend:

- ⊗ Proposed CPT location
- Proposed soil boring location



No.	Date	Revision	Approved

ENVIROforensics
 ENVIRONMENTAL FORENSIC INVESTIGATIONS, INC.
 4234 Hacienda Drive, Suite 200 • Pleasanton, CA 94588
 EnviroForensics.com

Date: 05/16/05
 Designed: OS
 Drawn: OS
 Checked: JC
 DWG file: 13109-05

PROPOSED SAMPLE LOCATION MAP
 Norman's Cleaners and Laundry
 2907 E. Street
 Eureka, CA

Figure
3
Project
591.A.03